

ABSTRACT

A remote, non-contact system for detecting a defect in a railroad wheel as the wheel is stationary or moving along a railroad track includes: (1) a pulsed, laser light source for generating an ultrasonic wave in the wheel, the ultrasonic wave having a direct portion and reflected and transmitted portions if the direct portion encounters a defect in the wheel, (2) an optical component in the path of the light from the light source for forming the light into a specified illumination pattern so that the generated ultrasonic wave has a specified wavefront, (3) an air-coupled transducer or a group of transducers for sensing the acoustic signal emanating from the wheel that results from the ultrasonic wave traveling through the wheel, and (4) a signal processor, responsive to the sensed acoustic signal, capable of distinguishing whether the sensed signal has a component that indicates the existence of a reflected portion in the ultrasonic wave, wherein the presence of such a component in the acoustic signal indicates the existence of a defect in the railroad wheel.

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